Somersworth Quadrangle, Maine

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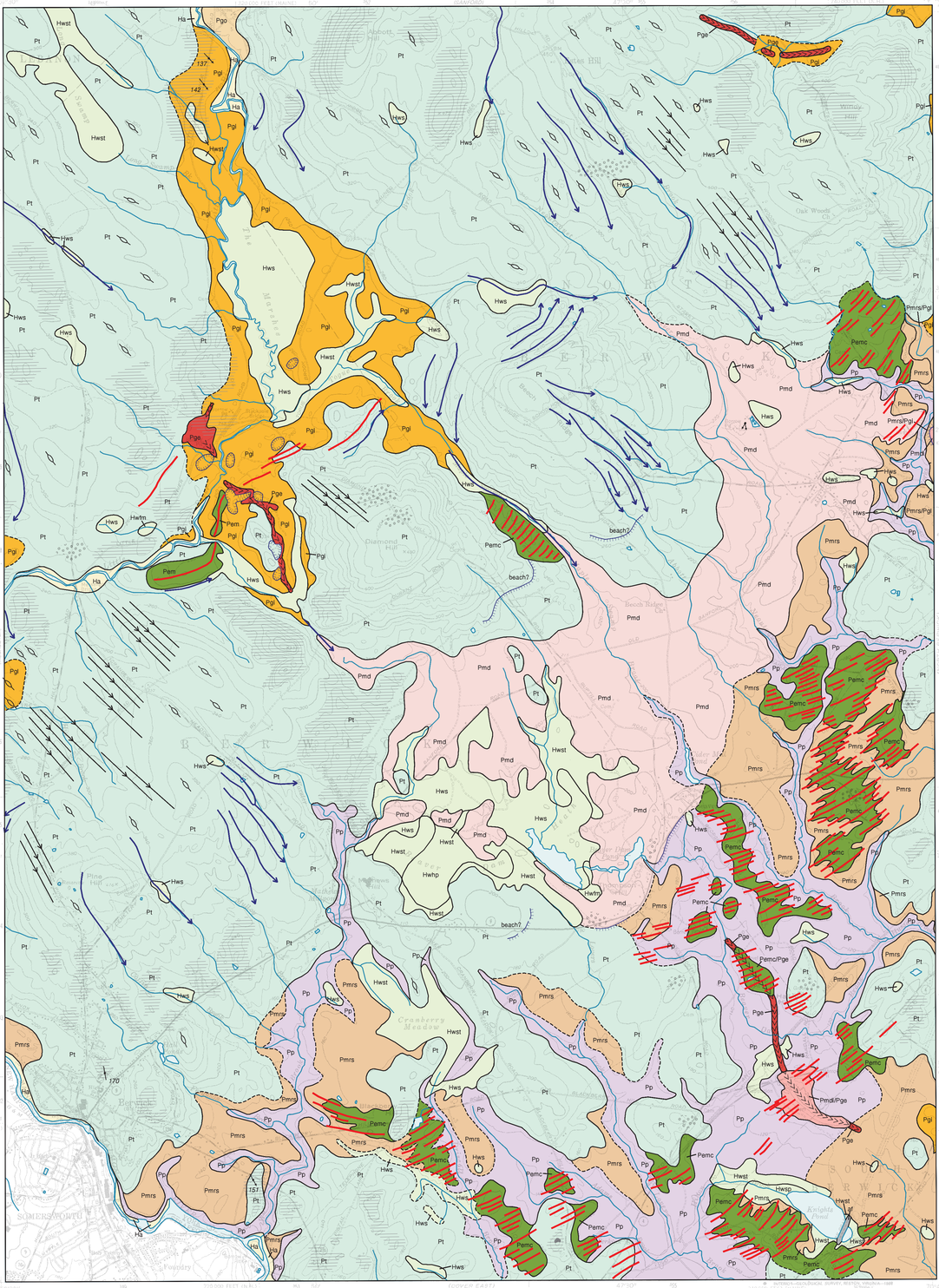
For additional information, see Open-File Report 99-130.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Geoffrey W. Smith completed during the 1989 field season; funding for this work provided by the Maine Geological Survey. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Somersworth quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Ha — **Stream alluvium -** Gray to brown fine sand and silt with some gravel. Comprises flood plains along present streams and rivers. Extent of alluvium approximates areas of potential flooding.

Hws — **Wetland, swamp*** - Muck, peat, silt, and sand. Poorly drained areas, often with standing water.

Hwfm — **Wetland, freshwater marsh -** Poorly drained freshwater grassland.

Hwhp — **Wetland, heath*** - Peat and fine-grained inorganic sediment. Distinguished from other wetlands by the absence of trees and the presence of shrubs.

Pmrs — **Marine regressive sand deposits -** Massive to stratified and cross-stratified, well sorted brown to gray-brown sand. May have gradational basal contact with unit Pp. Thickness between 1 and 5 m. Deposited during regressive phase of marine submergence.

Pp — **Presumpscot Formation -** Massive to laminated gray and blue-gray (weathering to brown) silt and silty clay. Locally may contain boulders, sand, and gravel. Occurs as blanket deposit over bedrock and older glacial sediments. Variable thickness from less than 1 m to more than 50 m. Deposited during period of late-glacial marine submergence.

Pmd, Pmdi — **Marine delta -** Coarse sand and gravel grading to sand and silt. Flat to gently sloping constructional surface formed by glacial streams discharging into late-glacial sea. Heads of ice-contact deltas (Pmdi) mark ice frontal positions. Sediments in distal portions of deltas commonly grade into glacial-marine sediments (Pp, Pmrs). Variable thickness from more than 30 m at delta head to less than 1 m at delta toe.

Pgi — **Ice-contact deposits (undifferentiated) -** Coarse gravel and sand deposited in contact with melting glacial ice. Average thickness probably between 10 and 15 m. Locally kettled.

Pge — **Esker -** Coarse gravel and sand comprising distinct linear ridges, deposited in glacial ice tunnels. May be more than 10 m thick.

Pgo — **Outwash -** Sand and gravel deposited by glacial meltwater in the Little River valley.

Pem — **End moraine -** Coarse gravel and sand. Locally includes till and silt. Generally occurs in areas of glacial-marine sediments (Pp, Pmrs) and is complexly interstratified with them. Formed at or near the ice front during retreat of marine-based glacier. Sediments commonly display significant deformation. Typically 5 to 10 m thick.

Pemc — **End moraine complex -** Coarse gravel, sand, till, and silt, commonly over shallow bedrock. Mapped in areas of closely spaced small (DeGeer) end moraines. Formed at or near ice front during retreat of marine-based glacier. Sediments commonly display significant deformation. Generally less than 5 m in thickness.

Pt — **Till -** Gray to gray-brown poorly sorted mixture of silt, sand, pebbles, cobbles, and boulders. Forms a blanket deposit over bedrock and is inferred to underlie younger sediments where not exposed at surface. Thin over topographic highs; thickens in topographic lows. May occur in and over end moraines (Pem, Pemc). Averages 3 to 5 m in thickness.

Bedrock - Bedrock of Paleozoic age. The ruled pattern indicates area where outcrops are common and surficial sediments are generally less than 3 m thick.

af — **Artificial fill -** Mainly composed of coarse gravel and sand, or various man-made materials.

Contact - Boundary between map units. Dashed where boundary is uncertain or inferred.

Moraine ridge - Ridge of till and/or water-laid sediments deposited in the marginal zone of the glacier. Lines indicate ridge crest.

Scarp - Symbol indicates scarps formed by stream erosion, or by marine erosion during period of higher sea level. Ticks are on downslope side of scarp line.

Esker ridge - Shows trend of sand and gravel ridge deposited in meltwater tunnel beneath the ice sheet (Pge). Chevrons indicate the direction of inferred meltwater flow.

135 — **Glacial striation locality -** Dot indicates point of observation. Arrow shows direction of ice flow if known. Number is azimuth in degrees of ice flow direction.

Glacially streamlined hill - Indicates a hill that has been elongated parallel to the direction of ice flow. The hill may be bedrock-cored.

Area of many large boulders

Kettlehole - Depression resulting from melting of a block of glacial ice.

Delta foresets - Range of dip directions of foreset beds in glacial marine delta.

Grooved till surface - Narrow ridges and grooves in till sculpted by flow of glacial ice.

Meltwater channel - Channel cut by glacial meltwater stream.

*NOTE: Wetland symbols followed by "i" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Smith, G. W., 1999, Surficial geology of the Somersworth 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-130, 7 p.
2. Smith, G. W., 1998, Surficial materials of the Somersworth quadrangle, Maine: Maine Geological Survey, Open-File Map 98-160.
3. Neil, C. D., 1998, Significant sand and gravel aquifers of the Somersworth quadrangle, Maine: Maine Geological Survey, Open-File Map 98-126.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G, 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.